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# Intelligent assistants in language learning: friends or foes?

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## ABSTRACT

We have entered the age of everyday encounters with artificial intelligence. Intelligent assistants (IAs) are increasingly available when educational activities are carried out using a portable or wearable device. These developments have special implications for language learners, many of whom now have access to immediate assistance, to artificial conversational partners, as well as to a large repertoire of smart tools and services to help them with specific challenges in communication and language learning. The rise of IAs can be seen against a backdrop of increasing opportunities for technology-supported and informal learning both inside and outside the classroom. This emerging learning landscape confronts language teachers with some difficult questions around adaptation of pedagogical methods and teachers' changing roles, that need to be better understood. IAs might be used to support learning or they might be misused. Are they friends or foes? The paper discusses the significance of IAs available to many learners on their smartphones and looks towards a future when they will be available even more widely and when intelligent robots will be used; it considers some of the capabilities of IAs in relation to challenges in language learning as well as the concerns they raise. Finally, the mobile learning community is urged to direct more research efforts towards this complex topic.

## Author Keywords

Mobile assistance; mobile language learning; MALL; artificial intelligence; conversational partners; language pedagogy

## INTRODUCTION

This paper elaborates on the concept of mobile (and increasingly intelligent) assistance, as described in Kukulska-Hulme (2016; 2018) and revisited here in the context of current societal debates that highlight both positive and negative aspects of the emerging age of pervasive artificial intelligence impacting on everyday lives, education and work. Mobile learning is constantly evolving, and intelligent tools are part of its growing repertoire of device features, applications and services. Intelligent assistants are software agents available on smartphones, computers, various devices and appliances; they can assist people with certain tasks, usually by interpreting natural language questions or commands and providing conversational responses using natural language (Bozkurt & Göksel, 2018; Hoy, 2018). To an extent, these conversations are similar to what can be witnessed between two human beings, including teachers and students. As such, they need to become a more prominent subject of scrutiny and inquiry when considered from the perspective of education, its challenges and its resourcing.

Despite efforts to increase worldwide participation in education and to improve its quality (UNESCO, 2015; UN 2017), millions of children and adults still have no access to it. Other children and adults, although they are in education, struggle to succeed. Along with massive open online courses and collections of openly available educational resources (Scanlon, McAndrew & O'Shea, 2015) smartphones and mobile learning have opened up new avenues, enabling more people to learn and to succeed in learning, wherever they are. Teachers and tutors are not always available or affordable when people have a need to learn, when they want to develop particular skills, or have a personal learning challenge. Consequently, they may look to online resources and diverse forms of assistance provided or mediated by technology. Mobile assistance on smartphones and other devices might complement other learning experiences by providing immediate, and increasingly personalized, support in the process of learning. Intelligent assistance is not yet universally available on affordable phones, but it is likely that this situation will change.

Intelligent assistants (IAs) are of special interest in the field of language learning, since the experience of learning a language is often deeply personal and ideally should be tailored to the individual. Language learning is an affective experience that touches people's identities as they try to formulate their thoughts and desires in a different language and become immersed in other cultures and different ways of thinking (Chastain, 1975; Ros i Solé, 2016). Language learning is also a common lifelong pursuit. Growth in international employment opportunities mean that there is often an urgent need to learn a new language, to improve existing knowledge or to 'get by' in social situations and work encounters. In classroom-based learning, there is a lack of time and individual attention, making it difficult or impossible to address learners' personal goals, concerns and challenges, and to adapt teaching to their individual needs. Language learning is

pursued widely outside the classroom on online platforms (e.g., iTalki, FluentU, Duolingo) and in informal group arrangements (e.g., on WhatsApp), where peer learning is common but has its limitations. Intelligent assistants are poised to respond to those circumstances and needs, however their role in this respect is, as yet, poorly understood. They may be viewed with suspicion, or as a welcome next step in technology-supported language learning. Given increasingly human-like interactions with artificially intelligent agents, and because of their human-like appearance as avatars or robots, IAs may be thought of as companions or friends. Alternatively, they may be thought of as monstrous creations that are threatening or inhibiting successful language learning.

So, are they friends or foes? That is the central question posed in this paper. Hence, the paper discusses the significance of IAs already available to many learners on their smartphones and looks towards a future when they will be available even more widely and when intelligent robots will be used; it considers some of the capabilities of IAs in relation to challenges in language learning as well as the concerns they raise. Finally, the mobile learning community is urged to direct more research efforts towards this complex topic.

## **THE SIGNIFICANCE OF ARTIFICIAL INTELLIGENCE AND INTELLIGENT ASSISTANCE**

With the dawn of the age of artificial intelligence (Boden, 2016), there are natural concerns that jobs will be lost or changed beyond recognition, including the profession of teaching (von Radowitz, 2017). It is claimed that a robot built in Sweden by Furhat Robotics can be used successfully in job recruitment interviews since it has some of the social skills and questioning capabilities of a human recruiter while also being free from bias (Sage, 2019). It is not difficult to imagine a similar robot doing some questioning as part of teaching, and indeed there is a growing body of research on robots performing teaching tasks, providing assistance or support, and being used to engage learners or stimulate their curiosity (e.g., Shiomi et al., 2015; Wu, Wang, & Chen, 2015; Granados et al., 2017). Most learners do not yet have access to robots, but many have access to increasingly intelligent tools and services on personally owned mobile and portable devices.

While a few years ago interactions with conversational agents were deemed to be “like having a really bad PA” [personal assistant] (Luger & Sellen, 2016), recent advances suggest that these services are constantly improving and it is becoming clearer in what circumstances they can be successfully applied, for example with children learning to read or in healthcare scenarios (Xu & Warschauer, 2019; Laranjo et al., 2018). It is therefore worth asking how IAs might be used positively, to complement or enhance the capabilities of learners and the resources of human teachers. In countries and regions where learners have access to the internet and advanced technologies, help is at hand, at least in theory, to smooth the way in multiple aspects of learning. IAs are commonly found on smartphones; they may be encountered on wearables such as watches, glasses and clothes; on smart home devices; and they are starting to appear in humanoid form as social robots (Li et al., 2016). They can also be incorporated in complex systems involving several parts of the body, for example as a ‘wearable affective robot’ that might recognize students’ emotions and improve education efficiency and quality (Chen et al., 2018). In everyday parlance, and as explained in Kukulska-Hulme (2016), ‘assistance’ is “a generic term that can include direct help, collaboration on a task, supportive words and actions, and provision of helpful scaffolds or resources” (p.139). IAs are deemed to be intelligent in a variety of ways, ranging from being highly knowledgeable, to being capable of collaborating, scaffolding or supporting people during a task, and being able to detect aspects of human behaviours and emotional states, using this information to adapt interactions with the human user. Greater intelligence may come from building up knowledge of users in a range of contexts and learning challenges over a period of time, and from advanced technologies that will be able to combine and make sense of inputs from many sources.

Yet the more help is readily available to learners, the more questions this raises as to whether learners are demonstrating their own learning outcomes or if these are the product of some form of substitution or collaboration with more skilled ‘others’. This is a broader issue in the age of the internet, since sophisticated technological advances create a sense of loss of control. Articles in the media and academic journals warn of the dangers of ‘contract cheating’: even online services for proofreading could be “fronts for contract cheating services” (McKie, 2019, p.16). Easy access to so-called ‘essay mills’ on the internet have shaken the assumption that work submitted by a student is their own (Medway, Roper and Gillooly, 2018). A rising tide of online tools and apps that help with calculating, reading, writing, translating and so on, call into question who is the creator or author of work that has been achieved with the help of a smart tool, and for education, it also raises the question of what kinds of things still need to be learnt and mastered.

All these developments have special significance for language learners, some of whom may now have access to artificial conversational partners as well as to a larger repertoire of tools and services to help them in language learning tasks and in situations where communication in the target language presents some difficulties. Wearable and portable translation gadgets are amongst these tools and services, contributing to a complex landscape of newly available technologies tacitly impacting educational practices -- or hovering on the margins of education with possibly benevolent or malevolent intent. The rise of IAs can be considered against a backdrop of increasing opportunities for technology-supported language learning both inside and outside the classroom, bringing informal learning with personal devices more strongly into focus. There are challenges in integrating informal learning, potentially supported by artificial intelligence, with more traditional classroom-based instruction. This emerging learning landscape confronts language teachers and learners with questions about adaptation of pedagogical methods and changing roles, that need to be discussed more widely and better understood.

## LANGUAGE LEARNING CHALLENGES AND CAPABILITIES OF INTELLIGENT ASSISTANTS

Language pedagogies cover a broad spectrum ranging from those that were developed for formal teaching, often oriented towards helping learners to pass examinations, to pedagogies for more informal settings where conversation practice may be the main objective; different varieties of pedagogy are also used depending on the learners' age group, whether they share a common first language, their specific learning purposes, and so on, and there are specialized approaches such as for the learning of English by adult speakers of other languages (ESOL – see e.g., Barton & Pitt, 2003). Some pedagogies emphasize learning of vocabulary and grammar, while others attempt to create a sense of immersion in authentic language materials and encourage learners to seek out opportunities to communicate with native/target language speakers. Open online language learning environments and social media are disrupting traditional practices and creating communities of learners who may not have access to teachers or may be able to choose online teachers/tutors that they particularly like. Those participating in online language learning include people who would never attend traditional face-to-face classes, though less is known about their language learning challenges and needs.

Digital technology has been applied in language learning for several decades and its use has also helped to identify areas of language learning in which people encounter particular difficulties or where individual sustained practice is desirable (e.g. pronunciation). Vocabulary learning has always been, and continues to be, a favourite focus. In a recent example, a Furhat robot has been used in an experiment showing that learners had better recall of newly learnt vocabulary when the words were practised with the robot as compared to an avatar on a screen or a disembodied voice (Wedenborn *et al.*, 2019). Mobile-assisted language learning already has a considerable history (Chinnery, 2006; Burston, 2015; Kukulska-Hulme & Viberg, 2018) and is branching out in several directions. New systems and applications continue to be developed and trialled, but learners are increasingly able to use new features and apps that are readily available on their phones. Tools like Google Lens enable users to explore their (foreign) surroundings and immediately obtain information about objects or translations of short texts. Such 'assistance' may help learners progress more quickly with vocabulary acquisition and cultural knowledge and may attend to their specific interests and needs.

As mentioned in Kukulska-Hulme (2018), recent conceptualisation of 'mobile assistance' owes its origins to the MASELTOV project (2012-15) where the focus was on opening up learning opportunities, immediate assistance and recommendations of resources to migrants and refugees through the provision of tools and services on smartphones in their everyday lives. The MASELTOV project consortium developed a mobile assistant as a suite of context-aware and integrated mobile services and tools for recent immigrants in Europe, which included short language lessons, a translation tool, a game to support cultural learning, help with navigating around the city, learning recommendations based on the user's interests and movements, and facilities for social interaction in the form of an online social forum and a social radar to summon volunteers willing to help (Kukulska-Hulme *et al.*, 2015). The research team began to explore how diverse forms of human assistance (teachers, friends, volunteers, mentors, online community) worked together with the provided tools and services to support learners in making the most of learning opportunities in their daily lives. Feedback from users suggested that human contact was important in motivating them, it sustained their engagement and encouraged them to consider new learning habits; however further research would be needed to understand more fully the balance between human and non-human assistance in the city-based informal contexts that were the focus of the project.

In other research focusing on language learning for immigrants outside the traditional classroom, Engwall (2019) describes the setup of a robot that will assist in the process of collaborative language learning (CORALL project), aiming to improve opportunities to learn and practise Swedish. The idea is that the relatively small 'robot tutor', which can be positioned on a table, is able to initiate, support and monitor the interaction between two language learners. The project combines the pedagogy of collaborative learning with technology developed for computer-assisted language learning and social robotics. An intriguing part of the project is modelling and tracking the learners' motivation state by detecting and recognizing their verbal and non-verbal acoustic output, facial expressions and posture, to be able to make adaptations. This is one example of how the approach mimics some of the capabilities of an attentive teacher or tutor, with the emphasis being on supporting learner-learner interactions.

The capabilities of artificially intelligent assistants, tutors and robots continue to expand, with a number of studies being focused on children's language learning. For example, Schicchi and Pilato (2018) describe a humanoid robot acting as a playfellow for children in a word-play game that helps them learn new vocabulary. Wallbridge *et al.* (2018) have experimented with robots for assisting children with language production and remark that a robot may be useful for standardization and automation of language assessment. However, other authors are voicing concerns around the introduction of robots in education, especially when children are involved. Writing about the context of classroom-based learning, Sharkey (2016) identifies many ethical concerns associated with 'robot teachers', including children's attachment, the danger of deception (when robots appear as if they understand and care for humans), and loss of human contact. She argues that classroom robots are likely to impact children's privacy, "especially when they masquerade as their friends and companions", when sensors are used and when records are kept.

## CONCLUSION

This paper outlines some important issues and developments in the field of ‘intelligent assistance’ in its current and emergent forms, ranging from IAs on everyday smartphones to robots that increasingly encroach on the territory of human-to-human interaction and the idea of a friendly companion in the process of learning. Ethical concerns, especially around deception (humans using technology to deceive other humans, or intelligent technology deceiving humans) are highlighted in response to the central question of whether IAs may be friends or foes. The capacity of IAs to misunderstand learners or offer inappropriate advice is another emerging concern. There is no simple answer, but there is a growing need to examine this area more closely. Intelligent assistants, with their increasingly human-like presence, blur the boundaries between humanity and technology, and the consequences could be profound.

Based on existing projects and their findings in this research space, which spans several disciplines and areas of expertise, it is possible to see an emerging picture of mobile (and increasingly intelligent) assistance, from the simplest to the most complex and sophisticated forms. Kukulska-Hulme (2016) offered a preliminary classification of assistance for mobile language learning and communication support, noting that sometimes technology would connect people to facilitate assistance, while in other cases assistance would be built into the design of materials, applications, tools or avatars. In the light of rapid advancements in artificial intelligence and the availability of increasingly intelligent assistants on smartphones and other devices that are used in everyday life, it is vital for the mobile learning research community to discuss these developments and their implications for research and practice, to shape a more extensive yet also targeted agenda for future work. As technologically advanced societies begin to adopt a growing array of intelligent assistants, we also need to question the repercussions for less economically advantaged societies, their education provision and individual students.

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